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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,917	09/18/2003	Lifeng Wang	MCS-040-03	6479

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EXAMINER	
PAPPAS, PETER	
ART UNIT	**PAPER NUMBER**
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/666,917	WANG ET AL.	
	Examiner	Art Unit	
	Peter-Anthony Pappas	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 20-27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. When nonfunctional descriptive material is recorded on some computer-readable medium, in a computer or on an electromagnetic carrier signal, it is not statutory since no requisite functionality is present to satisfy the practical application requirement. Merely claiming nonfunctional descriptive material, i.e., abstract ideas, stored in a computer-readable medium, in a computer, on an electromagnetic carrier signal does not make it statutory. See Diehr, 450 U.S. at 185-86, 209 USPQ at 8 (noting that the claims for an algorithm in Benson were unpatentable as abstract ideas because "[t]he sole practical application of the algorithm was in connection with the programming of a general purpose computer."). Such a result would exalt form over substance. In re Sarkar, 588 F.2d 1330, 1333, 200 USPQ 132, 137 (CCPA 1978). See also In re Johnson, 589 F.2d 1070, 1077, 200 USPQ 199, 206 (CCPA 1978) ("form of the claim is often an exercise in drafting").

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 11-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. In regard to claim 11 the language "...lighting each of the vertices... (line 6) is considered unclear. It is not clear whether (1) the input vertices (e.g., all the vertices) are lit or (2) the vertices remaining post culling are lit. Appropriate correction is required. For the purposes of applying prior art said language is considered to read on (2).

6. In regard to claims 13-18 the respective claim language is considered unclear. It is unclear as to whether said language intends to refer to vertices (plural) or a vertex (singular) as said language seems to mix together plural and singular language (e.g., "...whether a vertices forms..."; "discarding the vertices if it...", etc.). Appropriate correction is required. For the purposes of applying prior art said language is considered to read on a plurality of vertexes (i.e., vertices).

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-5, 9-12 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Baker et al. (U.S. Patent No. 7, 190, 362 B1).

9. In regard to claim 1 Baker et al. teaches a system (Fig. 4) for: transforming the rendering data containing vertices from model space into clip space (col. 1, lines 13-17; col. 1, lines 30-37; col. 2, lines 11-16); storing each of the vertices in a vertex cache (e.g., vertex database 411) as needed to facilitate a single streamline branched architecture that avoids processing duplication of the vertices (col. 1, lines 61-67; col. 2, lines 1-8, 16-18; col. 5, lines 18-23; Fig. 2; Fig. 4). It is noted that said system is considered to perform the method.

10. In regard to claim 2 Baker et al. teaches determining whether to cull (e.g., eliminate the storage of redundant vertex information) each the vertices prior to lighting the rendering data (col. 1, lines 61-67; col. 2, lines 1-8, 16-18; col. 5, lines 18-23; Fig. 2; Fig. 4, elements 210, 412, 420, 462 and 464).

11. In regard to claim 3 the rationale disclosed in the rejection of claim 2 is incorporated herein. As illustrated in Fig. 2 triangle 115 and triangle 125 share index entries in index list 220. Five entries in said index list 220 are used to represent six vertices. It is thus noted that one of said six vertices is considered to be "discarded" in that said system does not require a new entry to be created for it.

12. In regard to claim 4 the rationale disclosed in the rejection of claim 3 is incorporated herein. It is implicitly taught that processing of any vertices not culled is continued.

13. In regard to claim 5 Baker et al. teaches generating coordinates for the vertices by performing lighting and texture generation and transformation (col. 5, lines 49-55; Fig. 5A).

14. In regard to claim 9 Baker et al. teaches computer-readable media (e.g., memory 410) having computer-readable instructions for performing the computer-implemented method of claim 1 (Fig. 4). Vertex array 210 and output array 412 are stored in memory 410. It is noted that said arrays are considered to be implemented in software and stored within hardware (e.g., memory 410). It is further noted that the respective claim language discloses open-ended language (e.g., comprising) and that the respective claim language does not disclosed that said vertex cache is only implemented in software.

15. In regard to claim 10 Baker et al. the rationale disclosed in the rejection of claim 9 is incorporated herein.

16. In regard to claim 11 Baker et al. teaches a system (Fig. 4) for: inputting rendering data in model space containing vertices (col. 1, lines 13-17); transforming the rendering data from model space to clip space (col. 1, lines 30-37; col. 2, lines 11-16); determining whether to cull (e.g., eliminate the storage of redundant vertex information) at least some of the vertices prior to lighting the rendering data (col. 1, lines 61-67; col. 2, lines 1-8, 16-18; col. 5, lines 18-23; Fig. 2; Fig. 4, elements 210, 412, 420, 462 and 464); lighting each of the vertices to computer color (col. 2, lines 16-18; col. 4, lines 9-12). It is noted said system is considered to perform the process.

17. In regard to claim 12 the rationale disclosed in the rejection of claim 11 is incorporated herein (col. 2, lines 11-16).

18. In regard to claim 19 Baker et al. teaches computer-readable media (e.g., memory 410) having computer-readable instructions thereon, which when executed by one or more processors (e.g., geometry processor 420), cause one or more processor to implement the process of claim 11 (Fig. 4).

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

20. Claims 6, 7, 13-18 and 20-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al. (U.S. Patent No. 7, 190, 362 B1), as applied to claims 1-5, 9-12 and 19, in view of Foley et al. (Computer Graphics: Principles and Practice).

21. In regard to claim 6 Baker et al. fails to explicitly teach performing view frustum clipping on the coordinates after the lighting and texture generation and transformation. Foley et al. teaches the use of extents and bounding volumes (e.g., view frustum) for clipping (p. 237-242, § 6.2; 271-274, § 6.5.3; p. 660-663, § 15.2.3). It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate the teachings of Foley et al. into the system taught by Baker et al., because through such incorporation it would provide a means for reducing the amount of graphics data necessary to be rendered, thus resulting in a quicker and more efficient rendering

system. Furthermore, by clipping post processing it would remove the need to re-clip said information as said coordinates have undergone transformation and thus might have changed location.

22. In regard to claim 7 Baker et al. fails to explicitly teach wherein the coordinates are normalized homogenous coordinate system clip space coordinates. Foley et al. teaches the use of a normalized homogenous coordinate system (p. 204-208, § 5.2; 213-217, §5.6). It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate the teachings of Foley et al. into the system taught by Baker et al., because through such incorporation it would provide a conventional system for representing coordinate information and thus would not require specialized hardware for its implementation.

23. In regard to claim 13 Baker et al. fails to explicitly teach determining whether a vertices forms a back face of a triangle. Foley et al. teaches the concept of back-face culling, wherein it is determined whether a polygon is back-facing. Foley et al. teaches eliminating edges that are determined to be back-facing for a respective polygon (p. 663-664, § 15.2.4; p. 663, Fig. 15.17). It is noted that a polygon (e.g., a triangle) is considered to be defined by respective edges and vertices. It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate the teachings of Foley et al. into the system taught by Baker et al., because through such incorporation it would provide a means for reducing the amount of graphics data necessary to be rendered, thus resulting in a quicker and more efficient rendering system.

24. In regard to claim 14 the rationale disclosed in the rejection of claim 13 is incorporated herein. It is noted that the removal of an edge is considered to read on the removal of said edge's respective vertices.

25. In regard to claim 15 the rationale disclosed in the rejection of claim 13 is incorporated herein. It is implicitly taught that said vertices that do not form the back face of a polygon are kept (p. 663, Fig. 15.17).

26. In regard to claim 16 Baker et al. fails to explicitly teach determining whether a vertices is outside of one view frustum clip plane. Foley et al. teaches the use of extents and bounding volumes (e.g., view frustum) for clipping (p. 237-242, § 6.2; 271-274, § 6.5.3; p. 660-663, § 15.2.3). It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate the teachings of Foley et al. into the system taught by Baker et al., because through such incorporation it would provide a means for reducing the amount of graphics data necessary to be rendered, thus resulting in a quicker and more efficient rendering system.

27. In regard to claim 17 Foley et al. teaches that limiting the view volume can be useful in order to eliminate extraneous objects (p. 240). It is noted that the removal of an object (e.g., triangle) is considered to read on the removal of said triangle's respective vertices. The rationale disclosed in the rejection of claim 16 is incorporated herein.

28. In regard to claim 18 the rationale disclosed in the rejection of claim 16 is incorporated herein. It is implicitly taught that said vertices inside said view volume are kept.

29. In regard to claim 20 Baker et al. teaches computer-readable media (e.g., memory 410) having computer-readable instructions thereon (Fig. 4). The rationale disclosed in the rejection of claims 1, 11 and 16 are incorporated herein. Baker et al. teaches that said vertex information is derived from initial 3D information (col. 1, lines 8-10, 26-29). Baker et al. teaches the output of said vertex information in 2D (col. 2, lines 16-18, 51-58).

30. In regard to claim 21 the rationale disclosed in the rejection of claim 14 is incorporated herein.

31. In regard to claim 22 the rationale disclosed in the rejection of claims 3 and 15 are incorporated herein.

32. In regard to claim 23 the rationale disclosed in the rejection of claim 17 is incorporated herein.

33. In regard to claim 24 the rationale disclosed in the rejection of claims 3 and 18 are incorporated herein.

34. In regard to claim 25 the rationale disclosed in the rejection of claim 9 is incorporated herein.

35. In regard to claim 26 the rationale disclosed in the rejection of claim 6 is incorporated herein.

36. In regard to claim 27 the rationale disclosed in the rejection of claim 7 is incorporated herein.

37. In regard to claim 28 the rationale disclosed in the rejection of claim 11 is incorporated herein. As previously disclosed Baker et al. teaches storing each of the

vertices in a vertex cache (Fig. 4 – vertex database 411). Baker et al. additionally teaches transforming the rendering data into clip space (col. 1, lines 13-17, 30-37; col. 2, lines 11-16). While Baker et al. is silent in regard to a module for accomplishing said transformation it is inherent that said transformation would be performed by a given module. It is noted geometry processor 420 is considered to perform the functions of a lighting module.

Baker et al. fails to explicitly teach a culling module positioned before the lighting module that examines each of the vertices to determine whether to send vertices to the lighting module. Foley et al. teaches the use of extents and bounding volumes (e.g., view frustum) for clipping (p. 237-242, § 6.2; 271-274, § 6.5.3; p. 660-663, § 15.2.3). It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate said clipping taught Foley et al. into the system taught by Baker et al., prior to lighting, because through such incorporation it would provide a means for reducing the amount of graphics data necessary to be rendered, thus resulting in a quicker and more efficient rendering system.

38. In regard to claim 29 the rationale disclosed in the rejection of claim 9 is incorporated herein.

39. In regard to claim 30 the rationale disclosed in the rejection of claim 28 is incorporated herein (Foley et al. – p. 237-242, § 6.2; 271-274, § 6.5.3; p. 660-663, § 15.2.3).

40. In regard to claim 31 Baker et al. fails to explicitly teach a view frustum clipping module positioned after the lighting module and after a texture and generation and transformation module. It is noted that said geometry process 420 is considered functionally equivalent to a lighting module and texture and generation and transformation module. Foley et al. teaches the use of extents and bounding volumes (e.g., view frustum) for clipping (p. 237-242, § 6.2; 271-274, § 6.5.3; p. 660-663, § 15.2.3). It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate said clipping taught Foley et al. into the system taught by Baker et al., post lighting, because through such incorporation it would provide a means for reducing the amount of graphics data necessary to be rendered, thus resulting in a quicker and more efficient rendering system.

41. Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al. (U.S. Patent No. 7, 190, 362 B1), as applied to claims 1-5, 9-12 and 19, in view of Wang et al. (U.S. Patent No. 7, 139, 005 B2).

42. In regard to claim 8 Baker et al. fails to explicitly teach using Direct3D for mobile. Wang et al. teaches using Direct3D for mobile for rendering computer graphics information (col. 8, lines 11-44). It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate the teachings of Wang et al. into the system taught by Baker et al., because though such incorporation it would provide a rendering standard for allowing said graphic information to be presented on a mobile device resulting in said system being able to be utilized more widely (e.g., via mobility).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter-Anthony Pappas whose telephone number is 571-272-7646. The examiner can normally be reached on M-F 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Peter-Anthony Pappas
Examiner
Art Unit 2628

PP

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER